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A REVIEW OF THE GENUS *PLATECRIZOTES* FERRIÈRE (HYMENOPTERA: CHALCIDOIDEA: PTEROMALIDAE) WITH THE DESCRIPTION OF A NEW SPECIES FROM INDIA

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Abstract: The genus *Platecrizotes* Ferrière (1934) (Hymenoptera: Pteromalidae) is reviewed, and a new species, *P. keralensis* is described from India. Affinities of the new species with the other known species are discussed and a key to the world species is also provided.

Keywords: Key, India, new species, *Platecrizotes*, Pteromalidae, review.

The genus *Platecrizotes* Ferrière, 1934 (Type species *P. sudanensis* Ferrière) belongs to the subfamily Pteromalinae of Pteromalidae (Hymenoptera: Chalcidoidea) and is currently known by three species worldwide. Ferrière (1934) placed this genus in the subfamily Pireninae. Bouček (1964) noted the close affinity of *Platecrizotes* with *Pachycrepoideus* Ashmead, and considered the former genus as a member of the subfamily Pteromalinae. The three species are: *P. sudanensis* Ferrière (North and South Africa, Sudan, Senegal, Zimbabwe and Nigeria), *P. argentinensis* De Santis (Argentina) and *P. europaeus* Bouček (Moldova and Poland). Except for an undescribed species reported by Bouček et al. (1979) from Tamil Nadu (India), the genus is not yet reported from the Oriental region

(Noyes 2014).

While studying the host parasitoid associations of Pteromalidae in the agro ecosystems of Kerala (India), we reared adult parasitoids from the pupa of an unidentified dipterous genus near *Drosophila*. These pupae were found inside the putrefied fruits of bitter melon (*Momordica charantia* Linnaeus) from which adult drosophilid flies also emerged. On detailed examination, these parasitoids proved to belong to an unreported species of *Platecrizotes*, which is described below. This is the first description of a species of *Platecrizotes* from the Oriental region. A diagnosis of the genus and systematic account on the species of *Platecrizotes*, and a key to the identification of the four species are also provided.

MATERIAL AND METHODS

The study is based on the specimens reared from the host infested plant material, putrefied fruits of bitter melon collected from the cultivations of mixed vegetables from Vengeri, Kozhikode District, Kerala (11.3044°N & 75.7967°E). The fruits contained

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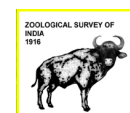
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unknown dipterous pupae, which are very near to the genus *Drosophila*, from which the adult parasitoids emerged. The emerged parasitoids were preserved in 70% ethyl alcohol and card-mounted for microscopic observation. The specimens were studied under a stereoscopic binocular microscope (Leica MZ16) and a forewing was removed from a paratype and mounted on a glass slide using Canada balsam. Photographs were taken with a Scanning Electron Microscope (Model JEOL Neoscope JCM-5000) and line drawings were prepared with a camera Lucida of Leica MZ16 microscope. The terminology used in the paper follows Gibson (1997).

The following abbreviations are used in the text: F1–F5 = Funicular segments 1 to 5; MV = Marginal vein; OOL = Minimum distance between a posterior ocellus and the corresponding eye margin; PMV = Postmarginal vein; POL = Minimum distance between the posterior ocelli; SMV = Submarginal vein; STV = Stigmal vein; T1–T5 = Tergites 1–5 of gaster.

The following acronyms are used for the depositories: BMNH - The Natural History Museum, London, UK; NMP - Narodni Muzeum v Praze, Prague, Czech Republic; MLP - Museo de La Plata, La Plata, Argentina; ZSIK - National Zoological Collections, Zoological Survey of India, Kozhikode, India.

Genus *Platecrizotes* Ferrière

Platecrizotes Ferrière, 1934: 90–92. Type species *Platecrizotes sudanensis* Ferrière, by monotypy.

Platecrizotes Ferrière: Bouček, 1963: 503–505. Bouček, 1964: 261. Graham, 1969: 356, 848. Bouček, Subba Rao & Farooqi, 1979: 453.

Diagnosis: Head and mesosoma dorso-ventrally flattened with pronotum, mesoscutum, scutellum and propodeum almost in the same plane. Head sub prognathous, face flat, scrobe rather shallow; eye hairy; vertex short, rounded off posteriorly; occiput not carinate; malar sulcus distinct; clypeus roundly or angularly produced. Antenna short, inserted below lower ocular line, in some cases just above mouth margin, 13-segmented, formula 11353; male antennal formula 11263; funicular segments strongly transverse in both sexes. Pronotal collar coarsely reticulate. Mesoscutum with regular fine to moderate reticulations, notauli complete or incomplete. Scutellum with finer reticulations, sometimes disc smooth and shiny; frenal groove not indented. Propodeum large, horizontal, nucha indicated, median carina vaguely indicated or absent, plicae sometimes indicated, spiracle touching the posterior margin of the metanotum. Forewing with MV swollen in the basal half, straight in the upper half.

Metasoma petiolate, petiole punctate, covered ventrally by the extension of first gastral sternite; T1 occupying about one-third to almost half of gaster, its hind margin broadly round or angularly produced and emarginated sub-laterally, T2 shorter than T1 but as long as T3 and T4 combined. Ovipositor sometimes strongly protruded beyond apex of gaster. In male, gastral tergites beyond T1 strongly retracted.

Distribution: Palaearctic, Afrotropical, Oriental and Neotropical regions of the world.

Hosts: Primary parasitoids of Dipterous pupae especially of the Cecidomyiidae, Drosophilidae, Anthomyiidae, Chloropidae, and sometimes Curculionidae (Coleoptera) and Noctuidae (Lepidoptera). Also recorded as secondary parasitoids through Braconidae (Noyes 2014).

1. *Platecrizotes keralensis* sp. nov.

(Images 1–4, Figs. 1–3)

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Material examined

Holotype: ZSIK/IR/INV/3426, female, 6.iii.2014, Vengeri, 11.3044°N & 75.7967°E, Kozhikode, Kerala, India, coll. Raseena Farsana. Paratypes: ZSIK, IR/INV/3427–30, 4 females, 1 male (1 female specimen processed for electron scanning microscopy), data same as that of holotype.

Etymology

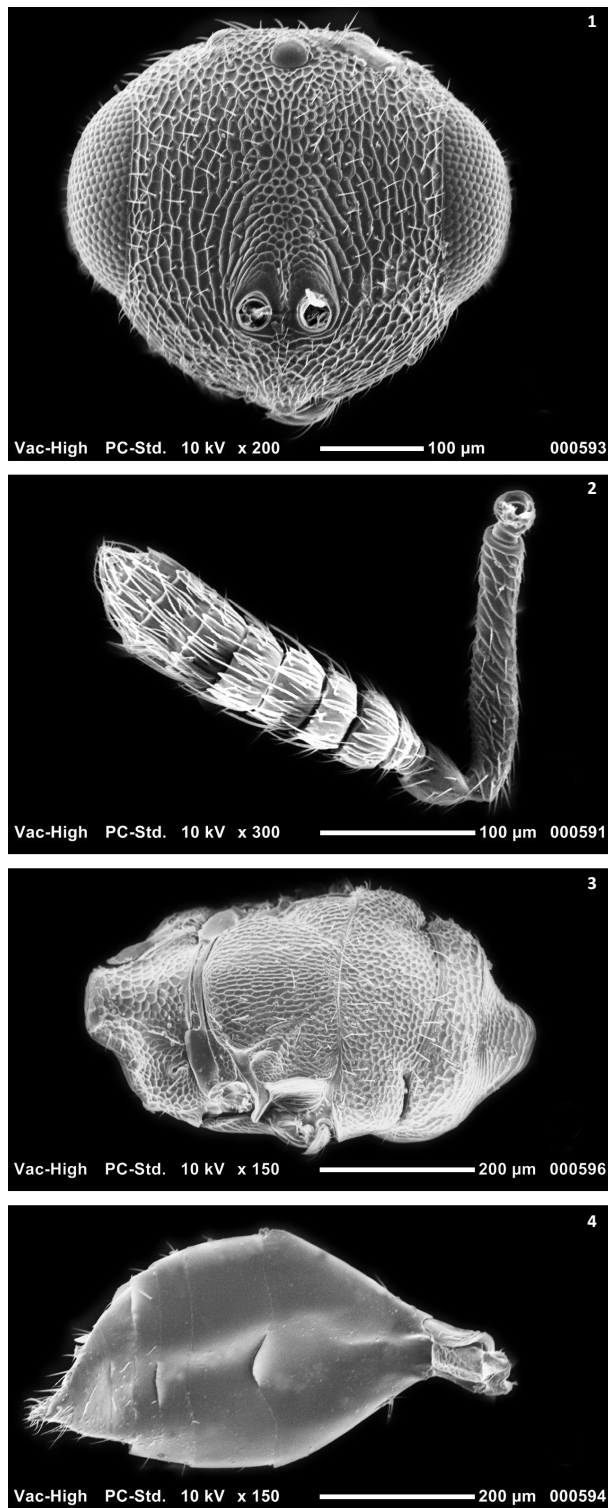
The species is named after Kerala State (India) from which collections were made.

Description

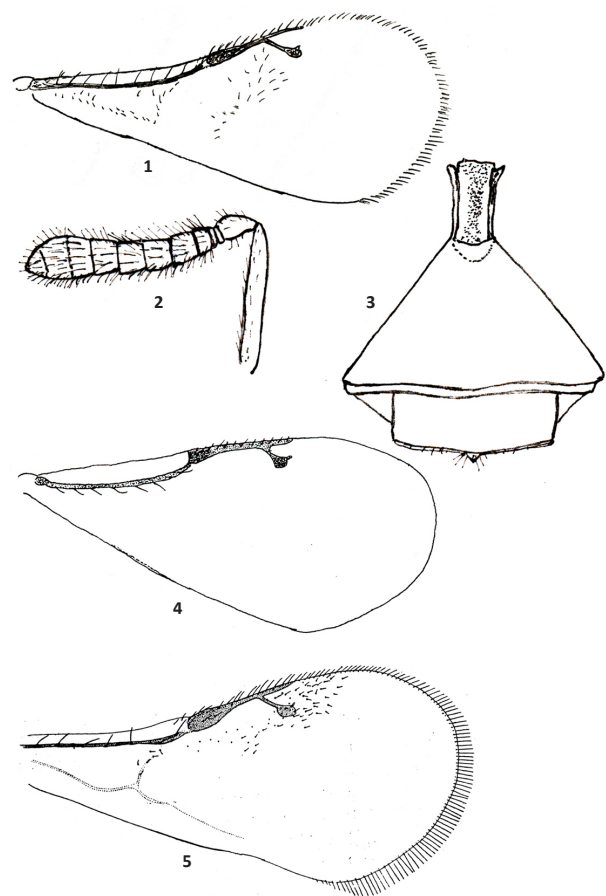
Female: Holotype. Length, 1.5mm (excluding exerted part of ovipositor), 1.7mm (including exerted part of ovipositor), Range: 1.5–1.6 mm (excluding ovipositor).

Colour: Body black. Head with eye and ocelli silvery. Antenna brownish black except scape, pedicel and anelli testaceous, upper part of pedicel more blackish, pubescence white. Tegula brown. Wings hyaline, veins and pubescence brown. Legs with coxae black, all femora dark brown, trochanters, tibiae and tarsi except tips testaceous, tips of tarsi brown. Ovipositor yellow.

Head (Image 1): sub prognathous, uniformly and moderately reticulate, with small white pubescence; reticulation on occipital area finer with meshes broad; head, in dorsal view, width 1.72× length; POL 1.3× OOL; head, in front view, 1.2×as wide as long; clypeus angularly produced, medially raised, defined at sides



Images 1–4. *Platecrizotes keralensis* sp. nov. Female (paratype). 1 - head, frontal view; 2 - antenna; 3 - mesosoma dorsal view; 4 - metasoma dorsal view.



Figures 1–3. *Platecrizotes keralensis* sp. nov. 1 - female forewing; 2 - male antenna; 3 - male metasoma dorsal view; 4 - *Platecrizotes argentinensis* De Santis, female forewing, (courtesy: De Santis 1988); 5 - *Platecrizotes sudanensis* Ferrière, female forewing (courtesy: Bouček 1963).

by incisions in mouth margin; antennal torulus (Image 1) separated by three diameter of it from lower margin of head; eye length $1.5\times$ width in profile; malar space $0.4\times$ eye length; malar sulcus less distinct; temple length $0.34\times$ eye length; eyes with small pubescence. Antenna (Image 2) with scape $1.9\times$ as long as eye, almost of uniform width, as long as funicle plus anelli, first and second anellus very thin, third a little wider; clava not distinctly separated from funicle, as long as 2.5 preceding segments combined; all funicular segments with one row of long sensillae.

Mesosoma (Image 3): Pronotal collar broad, anteriorly round, width $5\times$ median length, distinctly reticulate, meshes broad. Mesoscutum $2.5\times$ as broad as median length, distinctly reticulate, meshes not broad as on pronotum, notauli complete, deep in the anterior part, less distinct towards posterior end. Scutellum $1.1\times$ as broad as long, reticulation uniform and longitudinal, with a narrow smooth line in the middle, which is

less distinct in paratypes examined. Axilla similarly reticulate as on scutellum. Dorsellum narrow and shiny. Propodeum 2× as broad as median length, uniformly reticulate, reticulation on median area broad, callus with small hairs; plicae distinct, almost reaching base of well-defined nucha; spiracles elongated, oval, almost touching hind margin of metanotum. Prepectus broad, distinctly reticulate. Mesopleuron uniformly reticulate, but reticulation finer on upper mesepimeron; sub-alar area transversely reticulate; metapleuron distinctly reticulate. Forewing (Fig.1) length 2.21× width; discal pubescence sparse but distinct; marginal fringe long; basal cell closed below, sparsely hairy; speculum open below extending almost up to middle of MV; stigma moderately capitate; marginal vein moderately widened at base. Hind coxa distinctly reticulate with tuft of hairs postero-laterally; hind tibia with two unequal spurs.

Metasoma (Image 4): Gaster distinctly petiolate, petiole elongate, 2.5× as long as broad, finely but distinctly reticulate with a faint median keel, covered ventrally by the extension of first sternite up to three-fourths its length; 1.53× as long as broad in dorsal view; posterior margin of T1 angulate and sinuate on either side laterally; T2 0.4× as long as T1; T3, T4 and T5 subequal in length; ovipositor distinctly exerted in the holotype, length of exerted part 0.42× total length of gaster, but in all paratypes ovipositor not exerted.

Male: Length, 1.34mm. Resembles female, but differs from it in having antenna (Fig. 2) with two anelli and 6 funicular segments, second anellus thick; F1 smaller than other funicular segments, pubescence longer; gaster short, compressed and tergites beyond T2 retracted, hind margin of T1 not much angularly produced as in female (Fig. 3).

Host: Reared from dipterous pupa (near *Drosophila* sp.) breeding in putrefied fruits of bitter melon, probably parasitic in the pupae.

Discussion: This new species closely resembles *P. europaeus* in general morphology, body sculpture, pubescence and especially in the nature of antennal insertion which is just below the ocular line separated by three diameters of antennal torulus from mouth margin, nature of wings and antennae, but differs from it in having: antenna with clava 2.5× as long as preceding segments combined, with colour of scape, pedicel and anelli testaceous; clypeus angularly produced; scutellum disc not smooth and shiny; propodeum with plicae distinct, reaching up to base of nucha; wings hyaline; gastral petiole long, 2.5× as long as broad with a median keel; and T1 of gaster not reaching up to middle. In *P. europaeus*: antenna with clava as long as three

preceding segments combined and uniformly black; clypeus roundly produced; scutellum disc smooth and shiny; propodeum without plicae; wings subhyaline; gastral petiole slightly transverse without median keel; and T1 reaching almost up to middle. In the nature of gaster, and antenna the new species also resembles *P. sudanensis*, but in *sudanensis* antenna is inserted far below lower ocular line separated by only one diameter of the antennal torulus from the mouth margin and forewing with MV abruptly swollen in basal half. The other species of the genus *P. argentinensis* differs from the new species in having a rather straight MV, mesoscutum with notauli incomplete, forewing without marginal fringe and propodeum with a weak median carina.

2. *Platecrizotes sudanensis* Ferrière (Fig. 5)

Platecrizotes sudanensis Ferrière, 1934: 91-92. Holotype, female. Sudan (BMNH).

Spalangia pennisetae Risbec, 1951: 363. Female, Senegal. Synonymy by Bouček, 1963: 503.

Platecrizotes soudanensis Ferrière: Herting, 1973: 117. Misspelling of species name.

Platecrizotes sudanensis curculionis Risbec, 1954: 1077. Senegal. (Described as a variety)

Platecrizotes sudanensis dipterae Risbec, 1954: 1077. Senegal. (Described as a variety)

Diagnosis: (Based on the description by Bouček, 1951) Female. Antenna inserted below eye margin, toruli separated by one diameter of it from the mouth margin; clypeus sub truncate; both mandibles 4-toothed. Pronotum with collar angularly (not sharply) set off; mesoscutum with notauli indistinct; propodeum large, horizontal, median carina vaguely indicated, plicae indicated anteriorly by smooth streaks; propleuron strongly shifted forward, well visible from above. Forewing with SMV abruptly swollen in basal half, slender in the apical part, about twice as long as STV; basal fold with several hairs; cubital fold nearly bare; speculum extended below MV up to STV. Metasoma with petiole nearly twice as long as broad; gaster flat, oval-pointed, broader and shorter than mesosoma; T1 occupying about one-third of gaster.

Material examined: Nil.

Distribution: North and South Africa, Sudan, Senegal, Zimbabwe and Nigeria.

Host: Primary parasitoid of the Anthomyiidae, Chloropidae (Diptera) and Curculionidae (Coleoptera), Noctuidae (Lepidoptera), or secondary parasitoids through Braconidae (Noyes 2014).

Key to the world species of *Platecrizotes* Ferrière (females)

1. Forewing with MV abruptly swollen proximally (Fig. 5); antennal toruli separated by one diameter of it from the mouth margin (Africa) *P. sudanensis* Ferrière
- Forewing with MV hardly thickened at base or rather straight (Figs 1, 4); antennal toruli separated by at least two diameters of it from the mouth margin 2
2. Propodeum with a weak median carina; forewing with MV hardly thickened, and without marginal fringe (Fig. 4); mesoscutum with notauli incomplete (Argentina) *P. argentinensis* De Santis
- Propodeum without a median carina; forewing with MV thickened proximally, with marginal fringe distinct; mesoscutum with notauli complete though less distinct in the posterior part 3
3. Propodeum with plicae not indicated; antenna uniformly black, clava as long as three preceding segments combined; wing subhyaline; clypeus roundly produced; T1 reaching almost up to middle of gaster; petiole without median keel (Poland, Moldova) *P. europaeus* Bouček
- Propodeum with distinct plicae reaching upto base of nucha (Fig. 3); antenna brownish black with scape, pedicel and anelli testaceous, clava 2.5× as long as preceding segments combined; wing hyaline; clypeus angularly produced; T1 not reaching up to middle of gaster; petiole with a median keel (India) *P. keralensis* sp. nov.

3. *Platecrizotes argentinensis*, De Santis (Fig. 4)

Platecrizotes argentinensis De Santis, 1988: 43.

Holotype, female. Argentina (MLP).

Diagnosis: (Based on the description by De Santis 1988) Female. Length 1.6mm. Head not prognathous. Mesoscutum with notauli incomplete, propodeum with weak median carina. Forewing without marginal fringe, discal pubescence short less distinct. Relative lengths of SMV 35, MV19, PMV 5.5, STV 5.

Material examined: Nil.

Distribution: Argentina

Host: Not known.

4. *Platecrizotes europaeus* Bouček

Platecrizotes europaeus Bouček, 1964: 262. Holotype, female. Moldova (NMP).

Diagnosis: (Based on the description by Bouček, 1964) Female. Length 1.3–1.5 mm. Body bluish-black; antennae black; wings subhyaline, veins brown; trochanters, tips of tibiae and tarsi except tips testaceous. Head sub prognathous, clypeus semi circularly protruding; antennae inserted just below lower ocular line separated by at least three diameters of antennal torulus from mouth margin; eye with short pubescence. Antennal scape as long as whole funicle plus ring segments; all funicular segments twice as wide as long; clava as long as three preceding segments together. Mesoscutum with notauli complete, but posteriorly vague; scutellum on disc smooth and shiny; propodeum without median carina or plicae; propleuron not shifted forward. Forewing with MV less abruptly thickened at basal part; basal fold and cubital fold with hairs; speculum broadly open, extended on upper surface only up to basal half of MV. Metasoma with petiole slightly transverse; T1 almost reaching middle of gaster, T2 to T4 subequal in width.

Material examined: Nil.

Distribution: Poland, Moldova.

Host: Reared from puparia of dipterous genus near to *Drosophila*, primary pupal parasitoid, also reported from Cecidomyiidae (Diptera) (Noyes 2003).

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